

## WHAT IS CLAIMED IS:

1. A method of fabricating a Zn-base semiconductor light emitting device comprising the steps of:

forming, on a main surface of a substrate, a buffer layer  
5 composed of an In-base compound or a Zn-base compound not contained in the substrate; and

forming, on the buffer layer, a light emitting region composed of a Zn-base compound, wherein

the buffer layer is obtained by forming a stack as a  
10 polycrystal layer or an amorphous layer on the main surface of the substrate, and by annealing the stack before the light emitting region is formed.

2. The method of fabricating a Zn-base semiconductor light  
15 emitting device as claimed in Claim 1, wherein the substrate is a single-crystal substrate, and the stack is formed as a polycrystal layer composed of crystal grains oriented in the direction of the principal axis of the single-crystal substrate.

20 3. The method of fabricating a Zn-base semiconductor light emitting device as claimed in Claim 2, wherein the stack is formed so that columnar crystal grains spanned from the main surface of the substrate to the topmost surface of the stack are densely arranged on the main surface of the substrate.

4. The method of fabricating a Zn-base semiconductor light emitting device as claimed in Claim 3, wherein the columnar crystal grains are formed at a topmost surface of the stack so that the one and at least the adjacent one are formed while  
5 keeping a void therebetween.

5. The method of fabricating a Zn-base semiconductor light emitting device as claimed in Claim 1, wherein the substrate is a single-crystal substrate, the stack is formed as an amorphous  
10 layer, and the stack is annealed to convert itself into the polycrystal buffer layer.

6. The method of fabricating a Zn-base semiconductor light emitting device as claimed in Claim 1, wherein the temperature  
15 for the annealing is set higher than the formation temperature of the stack.

7. The method of fabricating a Zn-base semiconductor light emitting device as claimed in any one of Claims 1, 2 and 5,  
20 wherein the substrate is a sapphire substrate.

8. The method of fabricating a Zn-base semiconductor light emitting device as claimed in Claim 1, wherein the substrate is a glass substrate.

9. The method of fabricating a Zn-base semiconductor light emitting device as claimed in Claim 1, wherein the buffer layer is composed of indium tin oxide or zinc oxide.

5           10. A method of fabricating a Zn-base semiconductor light emitting device comprising the steps of:

          forming, on a main surface of a substrate, a buffer layer composed of an In-base compound or a Zn-base compound not contained in the substrate; and

10           forming, on the buffer layer, a light emitting region composed of a Zn-base compound, wherein

          the buffer layer is obtained by forming a stack composed of the In-base compound or the Zn-base compound at a temperature lower than the formation temperature of the light emitting region, and by annealing, before the light emitting region is formed, the stack at a temperature higher than the formation temperature of the light emitting region.

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          11. A method of fabricating a Zn-base semiconductor light emitting device comprising the steps of:

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          forming, on a main surface of a substrate, a buffer layer composed of an In-base compound or a Zn-base compound not contained in the substrate; and

          forming, on the buffer layer, a light emitting region composed of a Zn-base compound, wherein

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the buffer layer is obtained by forming a stack composed of the In-base compound or the Zn-base compound at a temperature lower than the formation temperature of the light emitting region, by annealing before the light emitting region is formed, the stack  
5 at a first annealing temperature set between the formation temperature of the light emitting region and the formation temperature of the stack, and by further annealing, the stack at a second annealing temperature set higher than the formation temperature of the light emitting region.

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12. The method of fabricating a Zn-base semiconductor light emitting device as claimed in Claim 11, wherein the buffer layer is formed by annealing the stack, which corresponds to a first layer portion of the buffer layer, at the first annealing  
15 temperature, by stacking the In-base compound or the Zn-base compound on the stack to thereby form a second layer portion of the buffer layer, and by annealing at the second annealing temperature.

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13. The method of fabricating a Zn-base semiconductor light emitting device as claimed in any one of Claims 10 to 12, wherein the buffer layer is composed of indium tin oxide or zinc oxide.

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14. The method of fabricating a Zn-base semiconductor

light emitting device as claimed in any one of Claims 6, 10 and 11, wherein the formation temperature of the stack is set to 400°C or below.

5           15. The method of fabricating a Zn-base semiconductor light emitting device as claimed in Claim 10 or 11, wherein the formation temperature of the light emitting region is set within a range from 300 to 1,000°C, both ends inclusive.

10           16. The method of fabricating a Zn-base semiconductor light emitting device as claimed in any one of Claims 1, 10 and 11, wherein an annealing atmosphere in the annealing is an oxygen-containing atmosphere.

15           17. The method of fabricating a Zn-base semiconductor light emitting device as claimed in any one of Claims 1, 10 and 11, wherein the buffer layer is formed to a thickness of 1  $\mu\text{m}$  or below.

20           18. A Zn-base semiconductor light emitting device comprising at least a buffer layer containing an In-base compound or a Zn-base compound not contained in the substrate, and a light emitting region composed of a Zn-base compound, wherein the buffer layer is a polycrystal layer or an amorphous  
25 layer obtained after crystallization.